Name:

at1124exam: Radicals and Squares (v911)

Question 1

Simplify the radical expressions.

$\sqrt{12}$	$\sqrt{50}$	$\sqrt{20}$
$\sqrt{2 \cdot 2 \cdot 3}$	$\sqrt{5 \cdot 5 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 5}$
$2\sqrt{3}$	$5\sqrt{2}$	$2\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$2\left((x+7)^2+8\right) \;=\; 88$$

First, divide both sides by 2.

$$(x+7)^2+8=44$$

Then, subtract 8 from both sides.

$$(x+7)^2=36$$

Undo the squaring. Remember the plus-minus symbol.

$$x+7=\pm 6$$

Subtract 7 from both sides.

$$x=-7\pm 6$$

So the two solutions are $x=-1$ and $x=-13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 16x = 57$$

$$x^2 + 16x + 64 = 57 + 64$$
$$x^2 + 16x + 64 = 121$$
$$(x+8)^2 = 121$$
$$x + 8 = \pm 11$$
$$x = -8 \pm 11$$
$$x = 3 \quad \text{or} \quad x = -19$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 + 12x + 23$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 6x) + 23$$

We want a perfect square. Halve 6 and square the result to get 9 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 6x + 9 - 9) + 23$$

Factor the perfect-square trinomial.

$$y = 2((x+3)^2 - 9) + 23$$

Distribute the 2.

$$y = 2(x+3)^2 - 18 + 23$$

Combine the constants to get **vertex form**:

$$y = 2(x+3)^2 + 5$$

The vertex is at point $(-3, 5)$.